

Notice of Allowability

Application No.

10/046,621

Examiner

Michael Kornakov

Applicant(s)

BOYKO ET AL.

Art Unit

1746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 01/14/2002.
 2. ☒ The allowed claim(s) is/are 1-4 and 7-17.
 3. ☒ The drawings filed on 14 January 2002 are accepted by the Examiner.
 4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
- * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date 01/14/2002
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. M. Bressler, esq., on 02/12/2004.

The application has been amended as follows:

Replace claim 1 with the following:

---A process of removing excess holefill material from a surface of an electronic substrate comprising the step of swelling said excess holefill material by contacting it with a swelling agent followed by the step of planarizing said surface of said substrate in the area contacted with said swelling agent, wherein the swelling agent is an aprotic polar organic solvent.---

This amendment is fully supported by the instant specification and made in order to better identify and distinguish the combination of processing steps, as instantly recited, from the prior art references.

Cancel claims 5 and 6.

In claim 7 replace the number "6" after the word "Claim" by the number ---1---

Art Unit: 1746

This amendment is made in order to establish proper dependency.

In claim 7 after the words "wherein said aprotic" insert ---polar organic---

In claim 11 delete the word "mechanical" after the words "wherein said"

This amendment is made in order to establish proper antecedent basis for claim terminology.

In claim 14 delete the word "mechanical" after the words "wherein said"

This amendment is made in order to establish proper antecedent basis for claim terminology.

In claim 15 delete the word "mechanical" after the words "wherein said"

This amendment is made in order to establish proper antecedent basis for claim terminology.

In claim 15 replace the words "lubricating agent" after the words "in the absence of any" by the words ---liquid except said swelling agent.---

In the Abstract

Replace the words "holefill residue " after the words "A process of removing" by the words ---excess holefill material---

Allowable Claims

2. Claims 1-4, 7-17 are allowable over the prior art of record.

Reasons for Allowance

3. The following is an examiner's statement of reasons for allowance: The closest prior art of record are JP 2-189993, Abe et al (U.S. 6,564,451), Miller et al (U.S. 6,537,608), Yoda et al (U.S. 6,177,490) and Alpaugh et al (U.S. 5,311,660).

JP'993 teaches removing method for hole filling resin of printed circuit board, wherein the excess (protrusion) of hole filling resin is removed by polishing the surface of a printed circuit board with polishing surface of a thin metal plate, covered with diamonds. Water and unspecified solvent are utilized during polishing to prevent diamonds from clogging. The teaching of JP'993 fails to provide or suggest any preceding step, which enhances removal of protruded resin by polishing and, therefore, the step of swelling the protruded resin by contacting it with swelling agent, as instantly claimed, is not anticipated or suggested fairly by JP'993.

Abe et al teach hole filling method for a printed wiring board and disclose, that during the hole filling procedure the hole filling resin is cured, which results in forming protrusions on the surface of the printing wiring board. In order to remove such protrusions the printed wiring board is flattened and smoothed by the use of mechanical polisher. The teaching of Abe et al does not anticipate or suggest fairly the separate step of swelling resin protrusions by contacting them with swelling agent prior to polishing, as instantly claimed.

Miller et al disclose formation of protrusions or nubs of resin during holefill of plated through holes. Such protrusions or nubs are removed by grinding with a sanding instrument. While indicating that such grinding may cause fracture of holefill material, Miller et al fail to anticipate or suggest fairly the step of swelling the resin protrusions by contacting them with swelling agent prior to grinding or sanding, which is the essence of the instant invention.

Yoda et al teach a method for permanently filling holes in printed circuit board, comprising the steps of pre-curing the protruded holefill resin by heat, followed by the removal of holefill protrusion, utilizing polishing. While disclosing a two-step procedure for removing holefill protrusion, Yoda et al fail to indicate or suggest the step of swelling the resin protrusions by contacting them with swelling agent prior to polishing.

Alpaugh et al disclose the process of removing polymer smear from vias and through holes of printed circuit boards, the said process comprising swelling the smear by contacting it with aprotic polar organic solvent, such as N,N-dimethyl formamide, followed by treatment with acidic oxidizing solution. The process of Alpaugh et al relates to processing prepregs and does not provide for filling of holes and vias with resin, and therefore, the step of planarizing the surface of circuit board is not anticipated or suggested by Alpaugh.

No other prior art that anticipates or suggests fairly the process comprising immediate consecutive steps as instantly claimed has been located as of the date of this office action. Therefore, claims 1-4, 7-17 are allowed over the prior art of record.

The additional prior art cited in PTOL-892 shows the general state of the art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Kornakov whose telephone number is (571) 272-1303. The examiner can normally be reached on 9:00am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on (571) 272-1302. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

M. KORNAKOV
2/12/04

Michael Kornakov

Application/Control Number: 10/046,621

Page 7

Art Unit: 1746

Examiner

Art Unit 1746